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UNIVERSITY OF MYSORE

Established: 1916

Vishwavidyanilaya Karyasoudha,
Crawford Hall, Mysore-570 005.

No.AC.2(S)/785/2019-20 Dated: 12.07.2019.

NOTIFICATION

Sub: Revision of syllabus & modifications in question paper model of B.Sc. Geology (UG), from the Academic Year 2019-20.

Ref: 1. Decision of Board of Studies in Earth Science (UG) meeting held on 15.12.2018.
2. Decision of the Faculty of Science & Technology Meeting held on 01.04.2019.
3. Decision of the Academic Council meeting held on 07.06.2019.

*****

The Board of Studies in Earth Science (UG) which met on 15.12.2018 has resolved and recommended to revise the syllabus & modifications in question paper model of V & VI semester for B.Sc. Geology course as per "CBCS & CAGP REGULATIONS 2018" from the Academic Year 2019-20.

The Faculty of Science and Technology and Academic Council meetings held on 01.04.2019 and 07.06.2019 respectively have approved the above said proposal and the same is hereby notified.

The revised syllabus & modified model question paper pattern of B.Sc. Geology course is annexed. The contents may be downloaded **from the University Website i.e., www.uni-mysore.ac.in**.

Draft approved by the Registrar

Sd/-
Deputy Registrar (Academic),

To:

1. The Registrar (Evaluation), University of Mysore, Mysore.
2. The Dean, Faculty of Science & Technology, DOS in Zoology, Manasagangotri, Mysore.
3. The Chairperson, BOS in Earth Science, DOS in Earth Science, Manasagangotri, Mysore.
4. The Chairperson, Department of Studies in Earth Science, Manasagangotri, Mysore.
5. The Director, College Development Council, Moulya Bhavan, Manasagangotri, Mysore.
6. The Deputy/Assistant Registrar/Superintendent, AB and EB, UOM, Mysore.
7. The P.A. to the Vice-Chancellor/Registrar/Registrar (Evaluation), UOM, Mysore.
8. Office file.

Name of the Course: Geology
Program: B.Sc.

Semester	Elective Course	Id	TITLE OF THE PAPER	LTP	Credit value	Total Credits
V	DSE	GEO501	Structural Geology And Gemmology	400	4	06
		GEO502	Structural Geology	002	2	
	SEC	GEO510	Hydrogeology	200	2	04
		GEO511	Engineering Geology	200	2	
VI	DSE	GEO601	Economic Geology and Geoexploration	400	4	06
		GEO602	Field Techniques	002	2	
	SEC	GEO610	Remote Sensing	400	2	04
		GEO611	Disaster and Natural Hazards management	002	2	

*** Each Practical is of 4 hours duration (2 hour practical=1 Credit)**

GEO501

SYLLABUS
(With New Regulations - CBCS & CAGP REGULATIONS 2018)

V SEMESTER B.Sc. DEGREE PROGRAMME
GEOLOGY
DSE : STRUCTURAL GEOLOGY AND GEMOLOGY

Total Teaching Hours: 64 **LTP/Credits: 400/4**
Teaching Hours: 4/Week. **Exam. Marks Total: 100**
Exam. Duration: 3 Hrs. **(C_1-10 mark: C_2-10 mark: C_3-80 mark)**
(C_1 Test -10 mark: C_2 Test -10 mark: C_3 Main Exam-80 mark)

Unit-1

Introduction: Structural Geology and its importance. Concept of deformation. Types of deformation

Forces - Tensional, Torsional. Shearing and Compressional. Structures: Primary and Secondary - Definition. Conformity, Unconformity - Definition - origin - types - Disconformity, Nonconformity and Angular unconformity. Recognition and significance.

Attitude of Beds: Definition of Dip.(True and Apparent) and Strike. Description of Compass. Clinometer and determination of Dip and Strike of beds.

Outcrop - Definition, width of an outcrop and thickness of bed. Factors controlling the width of a bed.

16 hrs

Unit-2

Lineations and foliations

Secondary structures: Folds: Definitions - parts of folds, Axis, Axial Planes, Limb, plunge. Crest and Troughs. Types of folds - symmetrical and Asymmetrical-Anticline, Syncline, Anticlinorium, Synclinorium, overturned fold, recumbent fold. isoclinal, chevron, fan folds, monocline and drag folds. Recognition of folds in the field. Mechanics and uses of folds.

Denudational structures - Outlier and Inlier 16 hrs

Unit-3

Joints: Definition, Dip, Strike. Joint plane, block Joint, Joint set, Joint system. Classification - Geometrical: Dip, Strike, Oblique and bedding joints - Genetic - columnar, mural sheet joints, Master joints. Importance of joints.

Faults: Definition - Elements of fault, Fault planes, Dip, Strike, Hade, Heave and Throw. Hanging and footwalls.

Classification of faults.

Geometrical: Based on attitude of faults as compared to the adjacent beds. Dip, Strike, Diagonal

and Bedding faults. Based on Apparent movement; normal and reverse faults.

Genetic: Thrust faults, over thrust, and under thrust. Gravity faults - Step fault, Ridge fault. trough faults. Criteria for recognition of faults in the field. 16 hrs

Unit-4

Gemmology – Introduction - A brief history of gemstones, Carot, Colour,Clarity, inclusions. Gem defects, water and fire. A detailed study of important gem minerals, their characters and occurrences- Indian occurrences in particular: Precious varieties: a)Diamond b) Ruby c) Sapphire, d)Topaz e) Emarald, f)Aqumarine, g) Pearls h)Zircon.

Semi precious varieties: a) Star ruby b) Star Sapphire. c) Spinels d) Garnets - different varieties

e) Malachite I) Lapislazuli g) Turquoiseh) Moonstone i) Tigers eye.

Synthetic gemstones and its importance. Gem cutting techniques. 16 hrs

Books:

Field Geology - Lahee, W.
Structural Geology - Billings, M.P.
Symbols for maps and rocks - Amer. Geol. Inst. Publ.
Gems and Gem Materials - Kvans, E.H. & Slawson, S.B.
Gemstones - Smith, H.
Gems - Webster, R.
Navarathnagalu - Prasaranga Publication, Mys.Univ.

GEO501

MODEL QUESTION PAPER FOR C_3

III B.Sc., V Semester Examination

GEOLOGY

Paper: **STRUCTURAL GEOLOGY AND GEMOLOGY** Max. Marks: 80

SECTION: A

Answer any FIVE questions 5 X 2 = 10 Mark

1.
2.
3.
4.
5.
6.

SECTION: B

Answer any SIX questions 6 X 5 = 30 Mark

7.
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10.
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14.

SECTION: C

Answer any FOUR questions 4 X10 = 40 Mark

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GEO502

SYLLABUS
(With New Regulations - CBCS & CAGP REGULATIONS 2018)

V SEMESTER B.Sc. DEGREE PROGRAMME
GEOLOGY
DSE – PRACTICAL STRUCTURAL GEOLOGY

Total Teaching Hours: 64 **LTP/Credits: 004/2**
Teaching Hours: 4/Week. **Exam. Marks Total: 50**
Exam. Duration: 3 Hrs.
(C_1 Assignment -5 mark: C_2 Seminar -5 mark: C_3 Main Exam-40 mark)

1 Calculation of the thickness of the strata: Geometric & mathematical
3 types- 3 problems each.
2 Study and Interpretation of Topographical Maps – Description of the relief features and
drawing of profile of contour maps.-3 maps.
3 Geological Maps – Drawing of section and interpretation.
Folds- 2 maps, Intrusion- 2 maps, Faults- 2 maps & Unconformities- 2 maps
4 Completion of outcrops- 3 maps.
5 Dip and Strike Problems. Geometric and trigonometric – 3 types – 2 problems each
6 Engineering maps: Tunnel, road, rail and dams – 1 map each

GEO502

MODEL QUESTION PAPER

1. Calculate the thickness /WOC of the strata by using geometric and mathematical methods. 2 X 3 = 6 Marks

2. Dip and Strike Problem 1 x 6 = 6 Marks

3. Draw the section of the given geological/structural map and give your interpretation. 2 X 7 = 14 Marks

4. Completion of outcrop 1 X 4 = 4 Marks

5. Practical Record and Viva-voce 5 + 5 =10 Mark

GEO510

SYLLABUS
(With New Regulations - CBCS & CAGP REGULATIONS 2018)

V SEMESTER B.Sc. DEGREE PROGRAMME
GEOLOGY
SEC – 1: HYDROGEOLOGY

Total Teaching Hours: 32 **LTP/Credits: 200/2**
Teaching Hours: 2/Week. **Exam. Marks Total: 50**
Exam. Duration: 3 Hrs. **(C_1-05 mark: C_2-05 mark: C_3-40 mark)**
(C_1 Test -05 mark: C_2 Test -05 mark: C_3 Main Exam-40 mark)

Unit - 1

Hydrologic cycle. Ground Water – Introduction, origin, types, occurrence, movement of ground water, Hydrologic properties of rocks: Porosity; permeability; specific yield; specific retention, hydraulic conductivity, transmissivity , storage coefficient. Water bearing geologic formations – Aquifers (confined, unconfined & perched), aquiclude, aquifuge, aquitar.

Well hydraulics: Steady, unsteady and radial flow, Darcy's Law and Its' applications, water table and its fluctuations; causative factors and their measurements; methods of pumping test and analysis of text data. 16 hrs

Unit - 2

Groundwater quality - Physical, chemical and biological properties of groundwater, drinking water standards, groundwater quality map of India.

Artificial recharge of groundwater; problem of over exploitation of groundwater; salt water intrusion in coastal aquifiers; remedial measures.

Interpretation of hydrogeomorphic units using satellite imageries. Radio isotopes in hydrogeological studies.

Hydrographs, water table contour maps, hydrostratigraphic units 16 hrs

BOOKS

Groundwater Hydorlogy - D. K. Todd
Hydrology - S. N, Davis and R.J.M. Dewiest
Groundwater - C. L. Tolman
Groundwater studies - R. H. Brown and Ahers
Groundwater Hydrology - Hermann Bouver
Hydrology - C. W. Fetter
Hand book and applied Hydrology - Ven Te Chew
Hydrology - Raghunath
Hydrology – Karanth

GEO511

SYLLABUS
(With New Regulations - CBCS & CAGP REGULATIONS 2018)

V SEMESTER B.Sc. DEGREE PROGRAMME
GEOLOGY
SEC – 2: ENGINEERING GEOLOGY

Total Teaching Hours: 32 **LTP/Credits: 200/2**
Teaching Hours: 2/Week. **Exam. Marks Total: 50**
Exam. Duration: 3 Hrs. **(C_1-05 mark: C_2-05 mark: C_3-40 mark)**
(C_1 Test -05 mark: C_2 Test -05 mark: C_3 Main Exam-40 mark)

UNIT – 1

Engineering Geology: Introduction: The role of geology in civil engineering.
Engineering properties of rocks –Building stones and road materials. Building stones of India- Granite, basalt, sandstone, shale, marble, charnockite,and laterite.
Soil: Soil profiles. Structure and texture of soils. Physical and chemical properties of soils. Classification of soil particle size.
Gravitation sloping processes.
Classification and description of modern gravitational processes based on type of movement- Slides, falls and flows. Causes of landslides. Subsidence- Carbonate dissolution in the subsurface, subsidence caused by human activities- underground mining and withdrawal of ground water 16 hrs

UNIT – 2

Stability of rock slopes and cutting in rocks: Classification of slopes- stable and unstable slopes- Geological parameters. Measures for stabilization of slopes. Cuttings in rock slopes- cut design and geological parameters.
Building sites: Requirements, foundation problems, ground conditions, building foundations in bedrock ground, soil, sloping ground.
Bridge sites: Bridge structure, types, bridge problems, and geological parameters.Geology of bridge sites.
Dams and reservoirs: Types of Dams: 1. masonary or concrete dams- gravity, arch and butress.2.Earth Dams and3.comp[osite dams. Location of dam. Geological considerations- topography, structure and lithology. Foundation and seepage problems in dams anf their treatment. Reservoir: Reservoir problems- seepage and silting.
Tunnels: terminology,definitions, types- hard rock and soft rock tunnels. Geological considerations- Lithology and structure. Ground failures in tunnels. Concrete aggregate sources, alkali-aggregate sources, alkali-aggregate reaction. Geological site investigations for engineering projects. Aseismic designing and earthquake resistant structures.
16 hrs.

Parbin Singh, “A Text Book of Engineering and General Geology”- Sixth revised Edition-2001. S K Kataria and Sons, Delhi.

B S Sathyanarayana Swamy, “A Text Book of Engineering Geology” – 2000 Edition, Dhanpat Rai & Co (P) Ltd. Delhi.

K M Bangar, “Principles of Engineering Geology” - First Edition -1995, Standard Publishers, Delhi.

S K Garg, “Physical and Engineering Geology” – Third Edition 1999- Khanna Publishers, Delhi 111006

K V G K Gokhale, “Principles of Engineering Geology” – Revised Edition 2005, B S Publications Hyderabad.

GEO510 AND GEO511

SKILL ENHANCEMENT COURSE

MODEL QUESTION PAPER FOR C_3
III B.Sc., V Semester Examination
GEOLOGY

Max. Marks: 40

SECTION: A

Answer any FOUR questions 4 X 5 = 20 Mark

1.
2.
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6.

SECTION: B

Answer any TWO questions 2 X 10 = 20 Mark

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10.

GEO601

SYLLABUS
(With New Regulations - CBCS & CAGP REGULATIONS 2018)

VI SEMESTER B.Sc. DEGREE PROGRAMME
GEOLOGY
DSE: ECONOMIC GEOLOGY AND GEOEXPLORATION

Total Teaching Hours: 64 **LTP/Credits: 400/4**
Teaching Hours: 4/Week. **Exam. Marks Total: 100**
Exam. Duration: 3 Hrs. **(C_1-10 mark: C_2-10 mark: C_3-80 mark)**
(C_1 Test -10 mark: C_2 Test -10 mark: C_3 Main Exam-80 mark)

Unit-1

Introduction to ore geology in relation of industry, commerce and national economy. Essential. strategic and critical minerals. Ore minerals. Gangue minerals, Tenor of ore. Principles and Processes of Ore formation Magmatic processes: Early and late magmatic deposits. Contact metasomatism: Skarn deposits.

Hydrothermal processes: Hydrothermal fluids and their migration and deposition. Cavity filling and Replacement deposits.

Contact Metasomatism – Skarn deposits

Weathering processes: Residual, mechanical concentrations (placers), alluvium, stream and marine Deposits. Sedimentation: Fe and Mn cycles.

Oxidation and supergene enrichment: Gossans.

Metamorphism

Classification of ore deposits - Jenson and Bateman. Metallogenic Epochs and Provinces.

16 hrs

Unit-2

Indian mineral deposits:

Study of the following Metallic deposits of India with special reference to Karnataka with regards to their mineralogy, origin. occurrence and distribution.

Gold, Copper, Iron. Manganese, Aluminium. Chromite

Study of the following Nonmetallic deposits of India with special reference to Karnataka with regards to their mineralogy, origin. occurrence and distribution:

Mica, Abrasives. Refractories, building and ornamental stones. Ceramic and Glass making minerals, Fertilizer and clay minerals.

Fossil fuels: Coal- stages and periods of coal formation. Lower Gondwana coalfields. Peat and lignite deposits. Petroleum - origin, migration and accumulation of oil traps, On-shore and Off-shore oil fields of India.

16 hrs

Unit – 3

Introduction on Prospecting and Exploration. Classification of Prospecting methods

Principless of Exploration: Geological, Geophysical and Geochemical Methods.

GEOLOGICAL EXPLORATION: Geological methods: River float tracing and panning. Guides and criteria for locating ore deposits. Guides: Geological and Non-geological guides. Primary and Secondary dispersion haloes, Gossans, Old workings. Criteria: Stratigraphic, lithological, structural, geomorphological, palaeogeographic and palaeoclimatic Criteria. Preliminary and detailed exploration, exploratory works – drilling and core logging. Exploratory grids. Sampling methods. Economic evaluation of mineral deposits based on UNFC classification.

16 hrs

Unit - 4

GEOCHEMICAL EXPLORATION AND BIO-GEOCHEMICAL EXPLORATION:

Introduction,Geochemical Cycle – Deep seated & surficial, geochemical mobility of elements. Pathfinder elements. Threshold values and geochemical anomaly. Dispersion – Primary & secondary. Lithogeochemistry, soil metallometry, stream

sediments, Hydrochemical, Atmochemical and Biogeochemical methods, Geobotany. Case studies of geochemical and geobotanical methods of exploration
An introduction to geophysical exploration: Application of resistivity method in search of groundwater 16 hrs

Books:

Economic Mineral Deposits - Jenson and Bateman, A.M.
Mineral Deposits by Lindgren
Ore Deposits by Park and Mc Diarmid
Ore-deposits of India - Gokhale and Rao
Indian Mineral Resources - Krishnaswamy, S and Sinha..
Metallic and Industrial minerals - Lamey, G.A.
Introduction to India's economic minerals - Sharma, N.L. and Ram. K.S.
A treatise on Industrial Minerals of India - Sinha. R.L.

GEO601

MODEL QUESTION PAPER FOR C_3
III B.Sc., VI Semester Examination
GEOLOGY
Paper: **ECONOMIC GEOLOGY** Max. Marks: 80

SECTION: A
Answer any FIVE questions 5 X 2 = 10 Mark
1.
2.
3.
4.
5.
6.

SECTION: B
Answer any SIX questions 6 X 5 = 30 Mark
7.
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SECTION: C
Answer any FOUR questions 4 X10 = 40 Mark
15.
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20.

GEO602

SYLLABUS
(With New Regulations - CBCS & CAGP REGULATIONS 2018)

VI SEMESTER B.Sc. DEGREE PROGRAMME
GEOLOGY
DSE – PRACTICAL FIELD TECHNIQUES

Total Teaching Hours: 64 **LTP/Credits: 004/2**
Teaching Hours: 4/Week. **Exam. Marks Total: 50**
Exam. Duration: 3 Hrs.
(C_1 Assignment -5 mark: C_2 Seminar -5 mark: C_3 Main Exam-40 mark)

a. Field visits
b. Out crop mapping, Determination of Attitude of Beds
c. Sample Collection
d. Report writing

GEO602

MODEL QUESTION PAPER – PRACTICAL

Paper DSE: PRACTICAL FIELD TECHNIQUES **40 Marks**

1 Submission & Evaluation of the Report ……. 15 Marks
2 Presentation …….. 15 Marks
3 Viva-voce …….. 10 Marks

GEO610

SYLLABUS
(With New Regulations - CBCS & CAGP REGULATIONS 2018)

VI SEMESTER B.Sc. DEGREE PROGRAMME
GEOLOGY
SEC: REMOTE SENSING

Total Teaching Hours: 32 **LTP/Credits: 200/2**
Teaching Hours: 2/Week. **Exam. Marks Total: 50**
Exam. Duration: 3 Hrs. **(C_1-05 mark: C_2-05 mark: C_3-40 mark)**
(C_1 Test -05 mark: C_2 Test -05 mark: C_3 Main Exam-40 mark)

Unit - 1

REMOTE SENSING: Introduction
Aerial Remote Sensing: Definition, scope of remote sensing in natural resources survey. Aerial Photography: Scale, sidelap overlap, drift and crab. Photographic flight mission; purpose, area, scale, aerial cameras and lens, flight direction, Time of photography, season of photography, overlaps. Types of aerial photography: Classification- vertical, low oblique, high oblique stereoscopy: A brief introduction of viewing, measuring and plotting instruments. Viewing instruments - lens and mirror stereoscopes. Preparation of Photo-Geological map- Mosaics and its types, photo interpretation and annotation, preparation of final photo-geological map. Elements of aerial photo-interpretation: photographic tone, texture, shape of objects, size of objects, patterns, scale.

16 hrs.

Unit - 2

Satellite Remote Sensing: Principles of Remote sensing, stages in remote sensing. Electromagnetic radiation - characteristics of electromagnetic spectrum; interaction of EMR with the earth's surface (reflection, surface roughness, transmission, spectral signature) and with the atmosphere (scattering, absorption, atmospheric windows, refraction, atmospheric haze). Platform, sensors, resolution, multispectral scanners- across- track and along- track multispectral Scanning, data reception and product generation. Microwave remote sensing: SLAR & SAR. Application of remote sensing in geoscience and geomorphological studies.

16 hrs.

GEO611

SYLLABUS
(With New Regulations - CBCS & CAGP REGULATIONS 2018)

VI SEMESTER B.Sc. DEGREE PROGRAMME
GEOLOGY
SEC: DISASTER AND NATURAL HAZARDS MANAGEMENT

Total Teaching Hours: 32 **LTP/Credits: 200/2**
Teaching Hours: 2/Week. **Exam. Marks Total: 50**
Exam. Duration: 3 Hrs. **(C_1-05 mark: C_2-05 mark: C_3-40 mark)**
(C_1 Test -05 mark: C_2 Test -05 mark: C_3 Main Exam-40 mark)

Unit - 1

Disaster Management: Disaster Terminology – Disaster, Risk, Hazards and vulnerability, vulnerability types, disaster preparedness, interventions in a disaster situation – relief, rehabilitation, disaster mitigation. The disaster management cycle. Disaster Management; objectives and priorities. Efforts to mitigate disasters world wide – International cooperation
Disaster Management System in India
Disaster Management Plans at various Levels. Preparedness
Types of Disasters & Nodal Ministries at Central Level
Local Level Risk Management
GIS & Remote Sensing for Natural Disaster Management. Hazard zonation maps.

16 hrs

Unit - 2

Natural Hazards Management
Earthquakes – Measures for earthquake risk reduction; Pre, medium term and post disaster preventive measures, Consolidation and reconstruction.
Floods – Mitigation; structural & non-structural groups, Preparedness, Response Mechanism, Damage Assessment, Post flood Management
Drought – Introduction, Types, Identification of Drought affected areas, Drought Management
Landslides – Mitigatory measures, Settlement policy
Avalanches – Avalanche Control Measures
Coastal erosion and mitigatory measures. 16 hrs

GEO610 AND GEO611

SKILL ENHANCEMENT COURSE

MODEL QUESTION PAPER FOR C_3
III B.Sc., VI Semester Examination
GEOLOGY

Max. Marks: 40

SECTION: A

Answer any FOUR questions 4 X 5 = 20 Mark

1.
2.
3.
4.
5.
6.

SECTION: B

Answer any TWO questions 2 X 10 = 20 Mark

7.
8.
9.
10.